

Smarter Planet Software Innovation Market Shares, Strategies, and Forecasts, Worldwide, 2011 to 2017

https://marketpublishers.com/r/S812A85852DEN.html

Date: October 2011

Pages: 434

Price: US\$ 3,600.00 (Single User License)

ID: S812A85852DEN

Abstracts

WinterGreen Research announces that it has a new study on Smart Computing Software Market Shares and Forecasts, Worldwide, 2011-2017. The 2011 study has 434 pages, 153 tables and figures. Smart computing is the wave of the future. Smarter computing evolves from interconnecting computing devices and sensor devices in a manner that permits integration of information from over the network. Sensors provide information about process. Sensors automate the smarter planet initiative. Decisions can be made based on machine to machine sensor based communication.

Economic and business conditions, rapid technological innovation, proliferation of the Internet and globalization are creating an increasingly competitive market environment that is driving corporations to transform the manner in which they operate.

Smarter planet seeks to implement the simplest modern engineering designs. The smarter planet vehicle of the 21st century is software and computing. Data centers implement a system that takes information from widely dispersed sensors and other systems in the smarter planet. Smarter products and smarter services are part of the innovation brought by smarter planet.

Smarter Planet software products have multiple purposes. New technologies emerge every day that enable us to keep pushing the boundaries of the possible. Manufacturers in every industry are integrating software engineering with mechanical and electronic engineering. They are interconnecting new smarter products with IT systems to deliver smarter, differentiated business services and to create new opportunities for innovative new services, increasingly connecting people and things in places and organizations around the world.



Advanced analytics change the world and leverage the smarter planet using systems. Where once we made inferences to gain understanding, now it is possible to use smarter planet computing to apply scientific principles to gain understanding of our surroundings. Where once we interpolated and extrapolated, now we can determine. That is the promise of a smarter planet.

Smarter planet systems are being implemented as smart buildings, greener buildings, smart grids, water management systems, smarter cities, traffic congestion solutions, and smart healthcare delivery. Systems have been difficult to manage. The size and complexity is worthy of note. Smarter planet techniques permit control of these complex systems.

Monitoring, connecting, and analyzing systems is part of the smarter planet initiative. Business, civic, and nongovernmental leaders are developing ways to manage these systems. IBM's strategy is to provide or enable technology and process management capabilities. IBM has the most comprehensive and integrated approach to smart planet systems development. Other market participants are able to offer significant piece parts.

The aim is to make the planet smarter. Technology is able to supplement manual labor and manual decision making. As enterprises have discovered the ways to make money with automated process, this business model is being extended by automating interactions with our surroundings in a machine to machine manner. The same technology useful for making business decisions is being turned to automate sensors.

Marketplaces are evolving, changing in ways companies did not have to consider in decades past: Escalating customer demands are being met with accelerating product cycles. What used to be three year product cycles have shifted to three month product cycles. Customer expectations about product and service are shifting in the direction of quality, reliability and technology innovation.

Increasing competition, emerging markets, lower barriers to entry, greater acceptance of the global supply chain, and accessibility to the global supply chain are market trends. Rising complexity is a part of smarter planet markets. Companies that do not position to adapt to complexity risk becoming irrelevant. Well positioned companies are seeking to capitalize on the complexity brought by smarter planet.

According to Susan Eustis, lead author of the study, 'This is a time of turbulent change, putting pressure on businesses of all sizes and across all industries. The world is changing in fundamental ways. It is becoming smaller, flatter and smarter. The level of



unrest among people over jobs or lack of jobs is unprecedented. As a result, leaders across all types of enterprises are faced with new challenges in order to remain successful. Those organizations who address these challenges using smart computing are positioned to outperform the competition.'

Worldwide smart computing software module markets at \$2.2 billion in 2011 are forecast to reach \$8.4 billion by 2017. Market growth is anticipated to occur as machine to machine communication of information becomes a reality. Integration systems and systems analytics are evolving to the point where the world can become more automated, safer, and more friendly to people all over the world. There is worldwide demand for sharing and equity at a basic level, not to the point of destroying individual initiative, but to the point of seeing that a rising tide raises all boats in the same harbor.

WinterGreen Research is an independent research organization funded by the sale of market research studies all over the world and by the implementation of ROI models that are used to calculate the total cost of ownership of equipment, services, and software. The company has 35 distributors worldwide, including Global Information Info Shop, Market Research.com, Research and Markets, Bloomberg, and Thompson Financial.



Contents

ENERGY HARVESTING EXECUTIVE SUMMARY

Energy Harvesting Market

Wireless Sensor Nodes

Energy Harvesting Minimization of Power Consumption

Energy Harvesting Market Shares

Energy Harvesting Market Forecasts

WINTERGREEN RESEARCH OPINION

Energy Harvesting Market AnalysisOpinion

Energy Harvester BenefitsOpinion

Energy Harvesting ChallengesOpinion

Energy Harvesting Current Limitations and Future IssuesOpinion

Energy Harvesting StandardsOpinion

IBM Smarter Planet DescriptionOpinion

AdvantagesOpinion

InnovationsOpinion

ChallengesOpinion

Marlow Industries Energy Harvesting DescriptionOpinion

AdvantagesOpinion

InnovationsOpinion

ChallengesOpinion

EnOcean GmbH Energy Harvesting DescriptionOpinion

AdvantagesOpinion

InnovationsOpinion

ChallengesOpinion

Northrop Grumman Energy Harvesting DescriptionOpinion

AdvantagesOpinion

InnovationsOpinion

ChallengesOpinion

Perpetua DescriptionOpinion

AdvantagesOpinion

InnovationsOpinion

ChallengesOpinion

GE Energy Harvesting DescriptionOpinion

AdvantagesOpinion



InnovationsOpinion

ChallengesOpinion

Alphabet Energy Harvesting DescriptionOpinion

AdvantagesOpinion

InnovationsOpinion

ChallengesOpinion

Micropelt GmbH DescriptionOpinion

AdvantagesOpinion

InnovationsOpinion

ChallengesOpinion

Omron Energy Harvesting DescriptionOpinion

Reference Market Research StudyOpinion

1. ENERGY HARVESTING MARKET DESCRIPTION AND MARKET DYNAMICS

- 1.1 World Economy Undergoing A Transformation
 - 1.1.1 Energy Harvesting Process Of Converting Energy From External Sources
 - 1.1.2 Energy Is Everywhere In The Environment
 - 1.1.3 Energy Harvesting
 - 1.1.4 Wireless Sensor Nodes Powered By Batteries
- 1.2 Zero Power Wireless Sensors
- 1.2.1 Energy Processors and Solid State Batteries Enable Zero Power Wireless Sensors
- 1.3 Energy Harvesting Value
 - 1.3.1 Energy Harvesting Applications
 - 1.3.2 Common Sources of Energy for Harvesting
- 1.4 Components of an Energy Harvesting System
- 1.5 Smarter Computing
 - 1.5.1 Energy Harvesting Power Management Solutions
- 1.6 Energy Harvesting Target Markets
- 1.7 Smart Buildings/Energy Harvesting
 - 1.7.1 Permanent Power for Wireless Sensors
 - 1.7.2 Electric Grid Energy Harvesting Services For Smart Buildings
 - 1.7.3 Commercial Applications For Advanced Batteries
 - 1.7.4 Challenges in Energy Harvesting System Design
 - 1.7.5 Ultra Capacitors
 - 1.7.6 Fuel Cells
- 1.8 Transportation Industry Target Market
 - 1.8.1 Transportation Use of Energy Harvesting



- 1.9 Energy Storage For Grid Stabilization
 - 1.9.1 Local Energy Storage Benefit For Utilities
- 1.10 Applications Require On-Printed Circuit Board Battery Power
 - 1.10.1 Thin-film vs. Printed Batteries
- 1.11 Battery Safety/Potential Hazards
- 1.12 Thin Film Solid-State Battery Construction
- 1.13 Battery Is Electrochemical Device
- 1.14 Battery Depends On Chemical Energy

2. ENERGY HARVESTING: VIBRATION, THERMOVOLTAICS, PIEZOELECTRICS MARKET SHARES AND FORECASTS

- 2.1 Energy Harvesting Market
 - 2.1.1 Wireless Sensor Nodes
 - 2.1.2 Energy Harvesting Minimization of Power Consumption
- 2.2 Energy Harvesting Market Shares
 - 2.2.1 Northrop Grumman
 - 2.2.2 EnOcean Equipped Devices
 - 2.2.3 EnOcean-Enabled Wireless Networks
 - 2.2.4 EnOcean-Enabled Wireless Networks Installed In Over 200,000 Buildings
 - 2.2.5 EnOcean Alliance
 - 2.2.6 Arveni
 - 2.2.7 GE HabiTEQ Systems/EnOcean Energy-Harvesting Joint Venture
 - 2.2.8 Silicon Laboratories
 - 2.2.9 Perpetua
 - 2.2.10 Perpetuum
 - 2.2.11 MicroGen Systems
 - 2.2.12 KCF Technologies
 - 2.2.13 Alphabet Silicon-Based Technology
 - 2.2.14 Arveni's Microgenerator Transforms Mechanical Energy
 - 2.2.15 Arveni Has Technology Specific To Piezo Energy Harvesting
 - 2.2.16 Boeing
 - 2.2.17 Marlow Industries
 - 2.2.18 Marlow Industries Inc
 - 2.2.19 Cymbet
 - 2.2.20 Infinite Power Solutions -
 - 2.2.21 Micropelt Energy Harvesting:
 - 2.2.22 Dust Networks
 - 2.2.23 Ferro Solutions



- 2.2.24 IBM Positions To Support Sensor Networks
- 2.2.25 GE Energy
- 2.2.26 Tadiran Batteries
- 2.2.27 GMZ
- 2.2.28 Cymtox
- 2.2.29 Ferro Solutions
- 2.2.30 Polatis Photonics
- 2.2.31 Rockwell Scientific
- 2.2.32 Omron Micro Electro Mechanical Systems (MEMS) Based Sensors
- 2.2.33 Omron Photovoltaic Inverter Technology
- 2.2.34 Selex Galileo
- 2.2.35 II-VI Incorporated
- 2.2.36 Leading Energy Harvesting Market Participants by Technology
- 2.3 Energy Harvesting Market Forecasts
 - 2.3.1 Smart City Energy Harvesting Shipments Market Forecasts
 - 2.3.2 Transportation Rail and Electric Vehicle Energy Harvesting Market Forecasts
 - 2.3.3 Smart Building Energy Harvesting Shipments Market Forecasts
 - 2.3.4 Smart Grid Meter and Substation Energy Harvesting Market Forecasts
 - 2.3.5 Sensor Nodes
 - 2.3.6 Military Use of Energy Sensing
 - 2.3.7 Global Desalination Industry
 - 2.3.8 Energy Harvesting Market Industry Segments, Units
- 2.4 Energy Harvesting Pricing
 - 2.4.1 Silicon Labs Energy Harvesting Pricing
 - 2.4.2 EnOcean products
 - 2.4.3 Selected Energy Harvesting Unit Retail Prices
 - 2.4.4 Thin Film Battery: STM, IPS, Cymbet, GS
 - 2.4.5 Thermal EH solutions
- 2.5 Thin Film and Printed Battery Market Shares, Dollars
- 2.6 Thin Film And Printed Battery Market Forecasts
- 2.7 Smarter Computing Depends on Instrumented Devices
 - 2.7.1 IBM The Leader In Smart Computing By A Wide Margin
 - 2.7.2 Advantages Offered By SOA
 - 2.7.3 SOA As An Architecture
 - 2.7.4 Thin Film Battery Market Driving Forces
 - 2.7.5 Smarter Computing Market Driving Forces
 - 2.7.6 IBM WebSphere Product Set Leverages Thin Film Batteries
 - 2.7.7 Thin Film Batteries Market Shares
- 2.8 Nanotechnology Providing Next Generation Systems



- 2.8.1 Nanotechnology Thin Film Batteries
- 2.8.2 Silver Nanoplates Silicon Strategy Shows Promise For Batteries
- 2.8.3 Argonne Scientists Watch Nanoparticles
- 2.8.4 Thin Film Batteries Use Nanotechnology to Achieve Combining Better

Performance With Lower Cost

- 2.9 Energy Harvesting Geographical Region Analysis
 - 2.9.1 Geographical Region Analysis

3. ENERGY HARVESTING PRODUCT DESCRIPTION

- 3.1 Energy Harvesting Devices
- 3.2 Marlow Industries Inc
- 3.2.1 Marlow Industries Converting Small Degrees Of Temperature Difference Into Milliwatts Of Electrical Power
- 3.3 Micropelt Energy Harvesting:
 - 3.3.1 Micropelt Two Micro Thermogenerators In Series
 - 3.3.2 Micropelt Thermoharvester
- 3.4 EnOcean
 - 3.4.1 EnOcean ECT 310 Thermo Energy Harvesting
 - 3.4.2 EnOcean Energy Harvesting Wireless Sensor Solutions
 - 3.4.3 EnOcean Alliance Energy Harvesting Solutions
 - 3.4.4 EnOcean-Enabled Wireless Networks
 - 3.4.5 EnOcean Alliance
- 3.5 Arveni
 - 3.5.1 Arveni's Microgenerator Transforms Mechanical Energy
- 3.6 Boeing
- 3.7 Ferro Solutions
 - 3.7.1 Ferro Solutions Energy Harvesters
 - 3.7.2 Ferro Solutions Inductive and PME.
 - 3.7.3 Ferro Solutions Piezo-based PME Energy Harvesters
 - 3.7.4 Ferro Solutions
- 3.8 KCF Technologies
 - 3.8.1 KCF Technologies Energy Harvesting for WMD Detection Systems
- 3.8.2 KCF Technologies Wireless Accelerometer with Ultra-Compact Energy

Harvesting for Rotorcraft

- 3.8.3 KCF Technologies Harvester-Powered Wireless Accelerometers for Extreme Temperature Monitoring in Fossil Fuel Power Plants
- 3.8.4 KCF Technologies Wireless Vibration Sensors for Shipboard Environments with Broadband Energy Harvesting



- 3.8.5 KCF Technologies Harvester-Powered Wireless Sensors for Industrial Machine Monitoring and Condition Based Maintenance
 - 3.8.6 KCF Technologies Piezoelectric and Smart Material Devices
- 3.8.7 KCF Technologies Compact Narrowband High-Acoustic Sound Source for Particle Agglomeration
- 3.8.8 KCF Technologies Low-Cost Liquid Atomization and Dispensing with a Miniature Piezoelectric Device
- 3.8.9 KCF Technologies Extreme Amplitude Piezoelectric Noise Source for HUMVEE Air Filter Cleaning
- 3.8.10 KCF Technologies High-Temperature Piezoelectric Alarm for Personnel Safety Devices
- 3.8.11 KCF Technologies Micro-Robot Swarms for Desktop Manufacturing
- 3.9 Trophos Energy
- 3.10 Millennial Net Wireless Sensor Network:
- 3.11 BYD-Developed Fe Battery
- 3.12 Researchers at MIT
- 3.13 Linear Technology
 - 3.13.1 Linear Technology Corporation
- 3.14 ReVolt Technologies
 - 3.14.1 ReVolt Technologies Button Cell Air Electrode
 - 3.14.2 ReVolt Technology Partners With BASF
- 3.15 Cymbet Energizing Innovation
 - 3.15.1 Cymbet Products
 - 3.15.2 Cymbet Rechargeable EnerChips and Effective Capacity
 - 3.15.3 Cymbet Development Support
- 3.15.4 Cymbet Solid State Energy Storage for Embedded Energy, Power Back-up and Energy Harvesting
- 3.15.5 Cymbet Energy Harvesting
- 3.15.6 Cymbet Zero Power Devices
- 3.15.7 ComtexCymbet EnerChip Thin-Film Batteries
- 3.15.8 Cymbet's EnerChip and Energy Harvesting Solutions
- 3.15.9 Cymbet EnerChip Solid State Battery Energy Harvesting (EH)/TI's LaunchPad Development Kit
 - 3.15.10 Cymbet Corporation
 - 3.15.11 Cymbet's EnerChip EP CBC915,
- 3.16 Infinite Power Solutions (IPS)—
 - 3.16.1 Infinite Power Solutions High-Volume Production Line for TFBs –
- 3.16.2 Infinite Power Solutions Solid-State, Rechargeable Thin-Film Micro-Energy Storage Devices



- 3.16.3 Infinite Power Solutions IPS THINERGY MEC Products
- 3.16.4 Infinite Power Solutions THINERGY MEC
- 3.16.5 Infinite Power Solutions, Inc. Recharge From A Regulated 4.10 V Source
- 3.16.6 Infinite Power Solutions, Inc. SRAM Backup Guidelines
- 3.16.7 Infinite Power Solutions, Inc. SRAM Backup Power Solution
- 3.16.8 Infinite Power Solutions Recharging THINERGY Micro-Energy Cells
- 3.16.9 Infinite Power Solutions Charging Methods
- 3.16.10 Infinite Power Solutions, Inc. THINERGY MECs
- 3.16.11 MicroGen Systems and Infinite Power Solutions Wireless Sensor Network (WSN)
- 3.16.12 Maxim Integrated, Infinite Power Solutions IC to Integrate All Of The Power-Management Functions For Ambient Energy Harvesting
- 3.16.13 Maxim Integrated Products (Nasdaq:MXIM) MAX17710 IC Integrates Power-Management
- 3.16.14 Maxim/Infinite Power Solutions, Inc. (IPS) THINERGY(R) Solid-State, Rechargeable MEC Battery Products
- 3.16.15 Maxim introduces MAX17710 PMIC: Uniquely enables Energy Harvesting with THINERGY MECs
 - 3.16.16 IPS iTHINERGY ADP
 - 3.16.17 IPS and ITT
- 3.16.18 Infinite Power Solutions, Inc. (IPS)— Global Leader In Manufacturing Solid-State
- 3.16.19 Infinite Power Solutions (IPS)
- 3.17 Schneider Electric Lighting Control Solutions for Comprehensive Facility Energy Management
- 3.18 Planar
 - 3.18.1 Planar Energy Devices
 - 3.18.2 Planar Energy's Solid State Batteries New Deposition Process
 - 3.18.3 Planar Energy Print Guide to Recent Battery Advances
 - 3.18.4 Planar Lithium Manganese Dioxide Nanotechnology
 - 3.18.5 Planar Energy Devices PowerPlane MXE Module
- 3.19 IBM Energy Scavenging, Power Scavenging
- 3.20 Cubic Global Tracking Solutions
- 3.21 Perpetuum
- 3.21.1 Perpetuum PMG Rail: Transportation/Powering Wireless Rail Monitoring Solutions
 - 3.21.2 Perpetuum Engineering Evaluation and Development
 - 3.21.3 Perpetuum Condition Monitoring
 - 3.21.4 Perpetuum Condition Monitoring Technology To Predict Failure



- 3.21.5 Perpetuum Holistic View Of Equipment Condition
- 3.21.6 Perpetuum Need For Greater Accuracy In Condition Assessment Failure Prediction
- 3.21.7 Perpetuum PMG FSH Free Standing Harvester Integrated Perpetual Power Solutions
- 3.21.8 Perpetuum Powering Wireless Rail Monitoring Solutions
- 3.21.9 Perpetuum Machine Vibration/Motion Energy Harvesting
- 3.21.10 Perpetuum Vibration Energy Harvesting
- 3.21.11 Perpetuum Vibration Source
- 3.21.12 Perpetuum Resonant Frequency: Tuning the Vibration Energy Harvester
- 3.21.13 Perpetuum Vibration Level: Achieving Maximum Power Output
- 3.21.14 Perpetuum Basic Operating Principles Of A Vibration Energy Harvester
- 3.22 Microchip Technology Inc
- 3.23 MicroGen Systems
- 3.24 MicroStrain
- 3.25 Nextreme Thermal Solutions
- 3.26 Patria
- 3.27 University of Michigan ISSCC
- 3.27.1 University of Michigan Intra-Ocular Pressure Monitor (IOPM) Device Ultra-Low Power Management
- 3.27.2 University of Michigan Intra-Ocular Pressure Monitor (IOPM) Device EH Wireless Sensor Components
- 3.27.3 University of Michigan Intra-Ocular Pressure Monitor (IOPM) Device Building Millimeter Scale EH-Based Computers
- 3.27.4 Permanent Power Using Cymbet Solid State Rechargeable Batteries
- 3.28 VigilX
- 3.29 MacSema
- 3.30 Omron Corp.
- 3.30.1 Omron Photovoltaic Inverter Technology
- 3.31 Silicon Labs Solutions For Energy Harvesting Systems
 - 3.31.1 Silicon Labs Energy Harvesting Tipping Point for Wireless Sensor Applications
 - 3.31.2 Silicon Laboratories Low-Power Optimization
 - 3.31.3 Silicon Labs Solutions For Energy Harvesting Systems
 - 3.31.4 Silicon Labs Minimizing The Amount Of Time The Radio Is On
 - 3.31.5 Silicon Laboratories Managing Harvested Energy
 - 3.31.6 Silicon Labs Ability To Power Wireless Sensor Nodes
- 3.31.7 Silicon Labs Powers Wireless Node with Energy Harvesting
- 3.32 Modern Water plc/Cymtox Limited
- 3.32.1 Modern Water plc/Cymtox Limited



- 3.33 Schneider Electric
- 3.34 ABB
- 3.34.1 GMZ
- 3.35 Kelk
- 3.36 Alphabet Energy
- 3.37 Perpetua
- 3.38 Phonomic Devices
- 3.39 ARPA-E Awardees \$100 Million to Advance Clean Energy Technologies

4. ENERGY HARVESTING TECHNOLOGY

- 4.1 Wireless Sensor Solutions For Use In Buildings And Industrial Installations Green. Smart. Wireless.
 - 4.1.1 Energy Harvesting Wireless Sensor Solution
 - 4.1.2 EnOcean Dolphin Interoperable System Architecture
- 4.2 Nanotechnology Graphene
 - 4.2.1 Nanoscale Semiconductor Materials:
 - 4.2.2 Nanotechnology Nanomaterials
- 4.3 Components of an Energy Harvesting System
- 4.4 Piezoelectric Devices
 - 4.4.1 Polymer Film Substrate for Thin Flexible Profile
 - 4.4.2 Comparison Of Battery Performances
- 4.5 Energy Densities
 - 4.5.1 Lithium-Ion Batteries
 - 4.5.2 Power Scavenging
 - 4.5.3 Temperature Gradients
 - 4.5.4 Human Power
 - 4.5.5 Pressure Variations
 - 4.5.6 Vibrations
- 4.6 Energy Harvesting Known As Power Harvesting Or Energy Scavenging
 - 4.6.1 Engine Coatings
 - 4.6.2 Self-Sustaining Materials
 - 4.6.3 Artificial Neural Networks
 - 4.6.4 Cloud Computing Social Networking-
- 4.7 Fabrication Of High Energy And Power Density Thin-Film Super-Capacitors
- 4.8 Silicon Carbide Substrate Market
- 4.9 Fraunhofer Institute
- 4.10 Tadiran Batteries
- 4.11 Perpetua



- 4.12 ZigBee Alliance
- 4.13 ALD Energy Harvesting Modules
- 4.14 Advanced Cerametrics

5. ENERGY HARVESTING COMPANY PROFILES

- 5.1 ABB
 - 5.1.1 ABB and IO Deliver Direct Current-Powered Data Center Module
 - 5.1.2 ABB/Validus DC Systems DC power infrastructure equipment
- 5.2 Adaptive Materials Technology Adaptamat Ltd
- 5.3 Alphabet Energy
 - 5.3.1 Alphabet Energy Inexpensive Waste Heat Recovery Technology
 - 5.3.2 Alphabet Thermoelectrics
- 5.4 Arrow Electronics
- 5.5 American Elements, USA 5.6 Avnet
- 5.7 Arveni
- 5.8 BAE Systems
 - 5.8.1 BAE Key Facts
 - 5.8.2 BAE Strategy
 - 5.8.3 BAE Operational Framework
 - 5.8.4 BAE Key Performance Indicators (KPIs)
 - 5.8.5 BAE Systems Ant Size Robot
 - 5.8.6 BAE Project Management
 - 5.8.7 BAE Engineering
 - 5.8.8 BAE Personal Robots
 - 5.8.9 BAE Systems Large UGV
- 5.8.10 BAE Systems Plc (BAES.L) Hired Advisors To Sell Part Of Its North American Commercial Aerospace Business
- 5.9 Boeing
 - 5.9.1 Boeing Automated Identification Technology (AIT)
 - 5.9.2 Boeing Structural Health Monitoring
 - 5.9.3 Boeing Aircraft Health Monitoring
 - 5.9.4 Boeing
 - 5.9.5 Boeing 787 Dreamliner
 - 5.9.6 Boeing 787 Dreamliner Performance
 - 5.9.7 Boeing Advanced Technology
 - 5.9.8 Boeing Participation In Commercial Jet Aircraft Market
 - 5.9.9 Boeing Participation In Defense Industry Jet Aircraft Market
 - 5.9.10 Boeing Defense, Space & Security



- 5.9.11 Boeing Advanced Military Aircraft:
- 5.9.12 Boeing Military Aircraft
- 5.9.13 Boeing Continuing Progress
- 5.9.14 Boeing-iRobot Team Receives New SUGV Task Order From US Army
- 5.10 CST
- 5.11 Cymbet
 - 5.11.1 Cymbet Team:
 - 5.11.2 Cymbet Investors:
 - 5.11.3 Cymbet Investors
 - 5.11.4 Cymbet Partners, Sales and Distribution:
 - 5.11.5 Cymbet Manufacturing:
- 5.11.6 Cymbet to Open World's Highest Volume Solid-State Battery Manufacturing Facility
 - 5.11.7 Cymbet Partnering with X-FAB
 - 5.11.8 Cymbet/X-FAB, Inc.
 - 5.11.9 Cymbet Expanding in Minnesota
- 5.11.10 Cymbet/LEDA 5.11.11 Distribution Agreement EnerChip Eco-Friendly Solid State Batteries
 - 5.11.12 Cymbet EVAL-09 Utilizes Harnessing Ambient Energy
- 5.11.13 Cymbet Secures \$31 Million in Private Financing
- 5.12 Digi International
 - 5.12.1 Digi International Revenue
 - 5.12.2 Digi International Business Highlights:
- 5.13 Dust Networks
 - 5.13.1 Dust Networks Self-Powered IPV6 Wireless Sensor Network
- 5.14 EnOcean GmbH
- 5.14.1 EnOcean Technology
- 5.15 Finmeccanica
 - 5.15.1 Finmeccanica/SELEX Galileo
 - 5.15.2 SELEX Galileo Inc.
 - 5.15.3 SELEX Galileo Technologies
- 5.16 Flexible Electronics Concepts
- 5.17 Ferro Solutions
 - 5.17.1 Ferro Solutions
- 5.18 Fraunhofer Institute for Integrated Circuits IIS
- 5.19 General Electric Company
- 5.19.1 GE Energy Wireless Condition Monitoring System/Perpetuum Electromagnetic Vibration Energy Harvesting Device
- 5.19.2 GE HabiTEQ Systems and EnOcean Energy-Harvesting Technology Joint



Venture

5.19.3 General Electric/EnOcean Equipped Devices Sensors Fit In Ultra-Thin Switches

On Glass Panels

5.19.4 GE Smart Energy Technologies

5.20 GMZ

5.21 Honeywell

5.21.1 Honeywell Energy-Harvesting Sensing and Control

5.22 Infinite Power Solutions

5.22.1 Infinite Power Solutions Solid-State, Thin-Film Batteries

5.22.2 Infinite Power Solutions Micro-Energy Storage Devices

5.22.3 Infinite Power Solutions Battery Applications

5.22.4 Infinite Power Solutions And Tokyo Electron Device Global Distribution

Agreement

5.22.5 Infinite Power Solutions Raises \$20.0m In Series C Financing

5.23 Invented

5.24 IO

5.25 ITN Lithium Technology

5.25.1 ITN's Lithium EC sub-Division Focused On Development And

Commercialization of EC

5.25.2 ITN's SSLB Division Thin-Film Battery Technology

5.25.3 ITN Lithium Air Battery

5.25.4 ITN Fuel Cell

5.25.5 ITN Thin-film Deposition Systems

5.25.6 ITN Real Time Process Control

5.25.7 ITN Plasmonics

5.26 II-VI incorporated/Marlow Industries

5.26.1 II-VI Incorporated (NASDAQ: IIVI)

5.26.2 II-VI Incorporated/Marlow Infrared And Near-Infrared Laser Optical Elements

5.26.3 II-VI incorporated/Marlow Markets

5.27 KCF Technologies Inc

5.28 Kelk

5.29 Levant Power

5.30 Micropelt

5.31 Millennial Net

5.31.1 Millennial Net Wireless Sensor Network:

5.31.2 Millennial Net's MeshScape GO WSN Technology

5.32 Modern Water

5.33 Nature Technology

5.34 Nextreme



- 5.35 Northrop Grumman
 - 5.35.1 Northrop Grumman Smart Grid
 - 5.35.2 Northrop Grumman
- 5.35.3 Northrop Grumman Corp (NOC.N) Spinning Off Or Selling Its Shipbuilding Business
 - 5.35.4 Northrop Grumman Remotec Robots
- 5.35.5 Northrop Grumman Opens New Facilities for Design and Manufacture of

Unmanned Ground Vehicles in Coventry

- 5.35.6 Northrop Grumman Business Sectors:
- 5.35.7 Northrop Grumman Aerospace Systems
- **5.36 OMRON**
 - 5.36.1 Omron Revenue
- 5.37 Planar Energy Devices
 - 5.37.1 DOE Selects Planar Energy for Oak Ridge National Laboratory Collaborative
- R&D Program to Advance Next-Generation Battery Development
- 5.38 Perpetua
- 5.39 Perpetuum
 - 5.39.1 Perpetuum Alliances
- 5.40 Phononic Devices
- 5.41 Polatis Photonics
 - 5.41.1 Polatis Technology and Products
- 5.42 PS
- 5.43 ReVolt Technology
 - 5.43.1 Executives of BMW and Gould Join ReVolt's Advisory Leadership Team
- 5.44 Teledyne/Rockwell Scientific
- 5.45 Severn Water/Modern Water/Cymtox Limited
- 5.46 Silicon Labs
- 5.46.1 Silicon Laboratories Energy Harvesting Applications
- 5.47 Schneider Electric
- 5.48 Syngenta Sensors UIC
- 5.49 Texas Instruments (TXN:NYSE)
 - 5.49.1 Texas Instruments
- 5.50 Trophos Energy
- 5.51 University of California, Berkeley
- 5.52 University of Michigan
 - 5.52.1 University of Michigan's Department of Electrical Engineering and Computer

Science Nano-Thin Sheets Of Metal

- 5.53 Zarlink Semiconductor AB
- 5.54 US Department of Energy's Advanced Research Projects Agency-Energy (ARPA-



E) Seed Funding

5.55 Selected Energy Harvesting Market Participants



List Of Tables

LIST OF TABLES AND FIGURES

Table ES-1 Energy Harvesting And Energy Storage Market Factors

Table ES-2 Energy Harvesting Market Driving Forces

Table ES-3 Energy Harvesting Wireless Network Applications

Figure ES-4 Energy Harvesting Market Shares, Dollars, First Three Quarters 2011

Figure ES-5 Energy Harvesting Sensor Network Shipments, Market Forecasts Dollars, Worldwide, 2012-2018

Table 1 Challenges In Battery And Energy Harvesting System Design Opinion -2

Energy Harvesting Market Description and Market Dynamics

Table 1-1 Smarter Planet Sensor Network Systems Functions

Figure 1-2 Energy Harvesting Circuit Board

Figure 1-3 Energy Harvesting on Bear Sensor

Table 1-4 Energy Harvesting Applications

Table 1-5 Common Sources of Energy Harvesting

Table 1-6 Components of an Energy Harvesting System

Figure 1-7 IBM WebSphere Application Server Implements Smarter Computing

Table 1-8 Energy Harvesting Target Markets

Table 1-9 Principal Features Used To Compare Rechargeable Batteries

Table 1-10 Challenges in Battery and Energy Harvesting System Design

Figure 1-11 BMW's Mini E Electric Car Powered By A Rechargeable Lithium-Ion Battery

Table 1-12 Examples of Hybrid Electric Vehicles

Figure 1-13 Typical Structure Of A Thin Film Solid State Battery Energy Harvesting Market Shares and Market Forecasts

Table 2-1 Energy Harvesting And Energy Storage Market Factors

Table 2-2 Energy Harvesting Market Driving Forces

Table 2-3 Energy Harvesting Wireless Network Applications

Figure 2-4 Energy Harvesting Market Shares, Dollars, First Three Quarters 2011

Table 2-5 Energy Harvesting Market Shares, Vibration, Piezoelectric, Thermoelectric,

Magnetic, Dollars, Worldwide, First Three Quarters 2011

Table 2-6 Perpetua Energy Harvesting Applications

Figure 2-7 Perpetuum Markets Served By Industry

Figure 2-8 Perpetuum ROI Addresses The Hidden Costs Of Under Monitored Assets

Figure 2-9 Perpetuum Estimates Number of BOP Machine Assets Under Monitored

Exceeds 70%

Table 2-10 IBM Positions To Support Sensor Networks



Figure 2-11 IBM Describes Smarter Plant Solutions Impact on IT

Figure 2-12 IBM Strategic Vision for Innovation

Table 2-13 Leading Energy Harvesting Market Participants by Technology

Figure 2-14 Energy Harvesting Sensor Network Shipments, Market Forecasts Dollars, Worldwide, 2012-2018

Figure 2-15 Energy Harvesting Sensor Network Shipments, Market

Forecasts Dollars, Worldwide, 2012-2018

Figure 2-16 Smart City Energy Harvesting Shipments Market Forecasts, Dollars,

Worldwide, 2012-2018

Figure 2-17 Smarter Computing Depends on Instrumented Devices

Figure 2-18 Transportation Rail and Electric Vehicle Energy Harvesting Market

Forecasts Dollars, Worldwide, 2012-2018

Figure 2-19 Number and Floor Space of US Commercial Buildings

Figure 2-20 Energy Use Intensity for LEED Certified Buildings (kBtu per Square Foot)

Figure 2-21 Smart Building Energy Harvesting Shipments Market Forecasts, Worldwide, Dollars, 2012-2018

Figure 2-22 Contractors And Construction Energy Harvesting Shipments Market Forecasts, Worldwide, Dollars, 2012-2018

Figure 2-23 Smart Grid Meter Energy Harvesting Market Forecasts Dollars, Worldwide, 2012-2018

Figure 2-24 Smart Grid Substation Energy Harvesting Shipments, Market Forecasts, Worldwide, 2012-2018

Figure 2-25 Airline/Space/Defense Industry Energy Harvesting Market Forecasts, Dollars, Worldwide, 2012-2018

Figure 2-26 Border and Perimeter Security Energy Harvesting Shipments Market Forecasts, Dollars, Worldwide, 2012-2018

Table 2-27 Energy Harvesting Market Industry Segments, Percent, Worldwide, 2012 -2018

Table 2-28 Energy Harvesting Market Industry Segments, Percent, Worldwide, 2012 -2018

Figure 2-29 Energy Harvesting Market Industry Segments, Units, Worldwide, 2012-2018

Table 2-30 Energy Harvesting Market Industry Segments, Units, Worldwide, 2012-2018

Figure 2-31 Marlow Energy Harvesting Device Price

Figure 2-32 Nextreme Energy Harvesting Modules WPG-1 WRLES PWR GEN 1mW 3.3, 4.1 OR 5V

Figure 2-33 MicroPelt Energy Harvester

Figure 2-34 Thin Film and Printed Battery Market Shares, Dollars, 2010

Table 2-35 Thin Film and Printed Battery Market Shares, Dollars, Worldwide, 2010 and First Three Quarters 2011



Figure 2-36 Thin Film and Printed Battery Markets Forecasts Dollars, Worldwide, 2011-2017

Table 2-37 Thin Film and Printed Battery Market Forecasts Dollars, Worldwide, 2011-2017

Table 2-38 Thin Film and Printed Battery Markets Forecasts Dollars, Worldwide, 2011-2017

Table 2-39 Thin Film and Printed Battery Market Industry Segments, Percent, Worldwide, 2011-2017

Figure 2-40 Smarter Computing Depends on Instrumented Devices

Figure 2-41 Smarter Planet Impact on IT

Table 2-42 Advantages Offered by SOA Table 2-41 Thin Film Battery Market Driving Forces

Table 2-42 Smarter Computing Market Driving Forces

Table 2-43 Thin Film Battery Benefits

Table 2-44 Comparison Of Battery Performance

Figure 2-45 Thin Film Battery Energy Density

Figure 2-46 Silver Nanoplates

Table 2-47 Energy Harvesting Regional Market Segments, Dollars, First Three Quarters 2011

Table 2-48 Energy Harvesting Regional Market Segments, 2010

Energy Harvesting Product Description

Figure 3-1 Marlow Industries Evergen

Table 3-2 Marlow Industries Evergen Energy Harvesting Solutions

Figure 3-3 Micropelt Thermoharvester

Figure 3-4 EnOcean ECO 100 - Motion Energy Harvesting

Table 3-5 EnOcean Energy Harvesting Motion Converter

Table 3-6 EnOcean Thermo Converter

Table 3-7 EnOcean Energy Converters For Energy Harvesting Wireless Applications

Figure 3-8 EnOcean-Enabled Wireless Sensor Networks

Table 3-9 EnOcean Alliance Energy Harvesting Solutions Advantages

Table 3-10 EnOcean Energy Harvesting Sources

Figure 3-11 EnOcean Energy Harvesting Wireless Sensor Technology

Figure 3-12 EnOcean Energy Harvesting Wireless Sensor Devices

Figure 3-13 Arveni Wireless Sensor

Table 3-14 Arveni Micro Generator Features

Table 3-15 Boeing Energy Harvesting Development Programs Functions

Figure 3-16 Broadband Energy Harvester (Boeing)

Figure 3-17 Broadband Energy Harvester (Boeing)

Figure 3-18 Ferro Solutions Wireless Sensor Network



Table 3-19 KCF Technologies Energy Harvesting Wireless Sensors Offered

Figure 3-20 KCF Technologies Smart Rod End for Wireless Monitoring of Helicopter Rotor Components

Figure 3-21 KCF Technologies Rotor Energy Harvesting Devices

Figure 3-22 KCF Technologies Harvester-Powered Wireless Accelerometers

Table 3-23 KCF Technologies Wireless Vibration Sensors for Shipboard Environments

Figure 3-24 KCF Technologies Harvester-Powered Wireless Sensors for Industrial Machine Monitoring

Table 3-25 KCF Technologies Energy Harvesting Devices

Table 3-26 KCF Technologies Piezoelectric Devices

Figure 3-27 KCF Technologies Compact Narrowband High-Acoustic Sound Source

Figure 3-28 KCF Technologies Liquid Atomization and Dispensing

Figure 3-29 KCF Technologies Extreme Amplitude Piezoelectric Noise Source for

HUMVEE Air Filter Cleaning

Table 3-30 Trophos Energy Marine Applications

Table 3-31 Trophos Energy Land Applications

Figure 3-32 Trophos Energy innovative Marine, Land, and Electrocics Power Generation Products

Figure 3-33 MIT Energy Harvesting Device Converts Low-Frequency Vibrations Into Electricity

Table 3-34 Linear Technology Comprehensive Line Of High Performance Battery

Figure 3-35 ReVolt TechnologieszFab Battery

Table 3-36 ReVolt Button Cell Air Electrode

Table 3-37 ReVolt Technology Partnership With BASF: Target Markets

Table 3-38 Cymbet Solid State Energy Storage Energizing Innovation Target Markets

Table 3-39 Cymbet Solid State Energy Storage products

Table 3-40 Cymbet EnerChip Solid-State Product Line

Table 3-41 Cymbet's EnerChip Benefits

Figure 3-42 Cymbet EnerChip CBC3105-BDC:

Table 3-43 Cymbet EnerChip CBC001-BDC: Target Markets

Table 3-44 Cymbet Energy Harvesting Applications

Table 3-45 Infinite Power Solutions THINERGY Product Family

Table 3-46 Infinite Power Solutions, Inc. Maxim Energy Management Chips

Table 3-47 Infinite Power Solutions, Inc. Applications For Energy Harvester

Table 3-48 Infinite Power Solutions Charging Methods

Table 3-49 Wireless Sensor Network Applications

Figure 3-50 Planar Energy's Solid State Batteries Spraying Materials Onto A Metal Substrate

Table 3-51 Applications Powered By PMG Rail



Table 3-52 Perpetuum Condition Monitoring Technologies

Table 3-53 Perpetuum Business Benefit To Dominate The Industrial Maintenance Scene

Figure 3-54 Perpetuum Vibration Energy-Harvesting Wireless Sensor Node

Components And Structure

Figure 3-55 Perpetuum Switch Mode Efficiency

Figure 3-56 Perpetuum Condition Assessment Need

Figure 3-57 Perpetuum Condition Assessment Principle of Operation

Figure 3-58 Perpetuum Vibration Energy Harvesting for Rail Cars

Figure 3-59 Perpetuum Vibration Energy Harvesting for Rail Wheels and Bearings

Figure 3-60 Perpetuum Temperature Variation Energy Harvesting for Rail Wheels and Bearings

Figure 3-61 Perpetuum Temperature Variation and Vibration Energy Harvesting Wireless Network Solution

Figure 3-62 Perpetuum Vibration Energy Harvesting Solution Benefits

Figure 3-63 Perpetuum Energy Harvesting ROI for Ten Years

Figure 3-64 Perpetuum Energy Harvesting Current Produced

Figure 3-65 Perpetuum Energy Harvesting Power Measurement

Figure 3-66 Perpetuum Energy Harvesting Wireless Monitoring

Figure 3-67 Perpetuum Energy Harvesting Installation

Figure 3-68 Perpetuum Energy Harvesting Innovation Solutions

Figure 3-69 Perpetuum Energy Free Standing Harvesting Development Kit

Figure 3-70 Perpetuum Energy Harvesting Wireless Monitoring and Automation

Figure 3-71 Perpetuum Energy Harvesting of Under Monitored BOP Assets

Figure 3-72 Perpetuum Power Output Spectrum

Figure 3-73 Perpetuum Vibration Energy Harvester powering the Wireless Sensor Node

Figure 3-74 Perpetuum Vibration Energy Harvesters

Figure 3-75 Perpetuum Power Solutions for Wireless Monitoring and Automation

Table 3-76 Perpetuum Vibration Energy Harvester (VEH) Functions

Figure 3-77 Perpetuum Vibration Energy Harvester

Table 3-78 Perpetuum Industrial Markets Served

Figure 3-79 Perpetuum Markets Served By Industry

Figure 3-80 Perpetuum ROI Addresses The Hidden Costs Of Under Monitored Assets

Figure 3-81 Perpetuum Estimates Number of BOP Machine Assets Under Monitored Exceeds 70%

Figure 3-82 Perpetuum Assessment of Machine Assets Under Monitored

Table 3-83 MicroGen Systems Leveraging of Factors Converging To Open Up

Opportunity In Energy Harvesting

Table 3-84 MicroGen Systems Energy Harvesting For Battlefield



Figure 3-85 University of Michigan Intra-Ocular Pressure Monitor (IOPM) Device

Wireless Sensor Basic Elements

Table 3-86 Silicon Labs Solutions For Energy Harvesting Applications

Table 3-87 Silicon Labs Solutions For Energy Harvesting Solutions

Table 3-88 Silicon Labs Solutions For Energy Harvesting Systems

Figure 3-89 Silicon Laboratories Wireless Sensor Node Power Cycle

Figure 3-90 Silicon Labs Solutions For Energy Harvesting Systems

Figure 3-91 Schneider Electric Energy Harvesting

Figure 3-92 Perpetua Renewable Energy Source for Wireless Sensors

Figure 3-93 Perpetua Renewable Energy Source Applications

Figure 3-94 Perpetua Energy Harvesting Device

Table 3-95 Perpetua Thermoelectric Technology Key Differentiating Features

Figure 3-96 Perpetua Technology Energy Harvesting Technology

Figure 4-1 Energy Harvesting Wireless Sensor Technology

Figure 4-2 Energy Harvesting Wireless Sensor Solution

Figure 4-3 EnOcean Dolphin Interoperable System Architecture

Table 4-4 Energy Harvesting Modules Functions

Figure 4-5 Graphene Nanostructure

Figure 4-6 Piezoelectric Devices

Table 4-7 Smarter Computing Market Driving Forces

Table 4-8 Thin Film Battery Benefits

Table 4-9 Comparison Of Battery Performance

Figure 4-10 Thin Film Battery Energy Density

Figure 4-11 Comparison of Power Density of Energy Harvesting Methods/

Figure 4-12 Perpetua Flexible Thermoelectric Film

Figure 4-13 Perpetua Technology Energy Harvesting Company Profiles

Table 5-1 ABB Product Launches

Figure 5-2 Alphabet Energy Heat To Electricity Examples

Figure 5-3 Arveni Wireless Sensor Block Diagram

Table 5-4 ARVENI's Microgenerators Systems Functions

Figure 5-5 BAE Military Robot in Development

Figure 5-6 Boeing Vulture technology

Table 5-7 Boeing Military Aircraft Key programs

Table 5-8 Boeing Unmanned Airborne Systems:

Table 5-9 Boeing Weapons:

Table 5-10 CST Target Markets

Table 5-11 Selected Enocean Shareholders:

Figure 5-12 Ferro Solutions Energy Harvesters And Sensors

Figure 5-13 Ferro Solutions Energy Harvesters And Sensors Target Markets



Table 5-14 Ferro Solutions Selected Clients

Table 5-15 Ferro Solutions Energy Harvester Uses

Table 5-16 Ferro Solutions FS Energy Harvester Industrial & Process Automation and Utilities

Table 5-17 Honeywell Energy-Harvesting Sensing and Control

Table 5-18 ITN Technologies

Figure 5-19 ITN Thin Film Battery Technology

Figure 5-20 ITN Battery

Figure 5-21 ITN Thin-Film Deposition Systems

Figure 5-22 ITN's Thin-Film Deposition Systems

Table 5-23 ITN Thin-Film Deposition Systems Products and Services Offered

Table 5-24 ITN Thin-Film Deposition Systems

Figure 5-25 ITNIYN Fuel Cells

Table 5-26 KCF Technologies Core Technical Focus Areas

Table 5-27 Kelk Recent Orders

Table 5-28 Millennial Net's MeshScape System Functions

Table 5-29 MeshScape GO Deployment Components:Omron Revenue

Figure 5-30 Perpetua Renewable Energy Solutions For Wireless Sensors

Figure 5-31 Perpetua Energy Harvesting Product Set

Table 5-32 Perpetua's Thermoelectric Technology Features

Table 5-33 Trophos Energy Harvesting Power Solutions Applications



I would like to order

Product name: Smarter Planet Software Innovation Market Shares, Strategies, and Forecasts,

Worldwide, 2011 to 2017

Product link: https://marketpublishers.com/r/S812A85852DEN.html

Price: US\$ 3,600.00 (Single User License / Electronic Delivery)

If you want to order Corporate License or Hard Copy, please, contact our Customer

Service:

info@marketpublishers.com

Payment

First name:

To pay by Credit Card (Visa, MasterCard, American Express, PayPal), please, click button on product page https://marketpublishers.com/r/S812A85852DEN.html

To pay by Wire Transfer, please, fill in your contact details in the form below:

Last name:	
Email:	
Company:	
Address:	
City:	
Zip code:	
Country:	
Tel:	
Fax:	
Your message:	
	**All fields are required
	Custumer signature

Please, note that by ordering from marketpublishers.com you are agreeing to our Terms & Conditions at https://marketpublishers.com/docs/terms.html

To place an order via fax simply print this form, fill in the information below and fax the completed form to +44 20 7900 3970



